Name_____

Unit 3 Test
PRACTICE VERSION

Expectation	Level Achieved
A3 - verify graphically and algebraically the rules for determining derivatives; apply these rules to determine the derivatives of polynomial, sinusoidal, exponential, rational, and radical functions, and simple combinations of functions; and solve related problems.	
B2. solve problems, including optimization problems, that require the use of the concepts and procedures associated with the derivative, including problems arising from real-world applications and involving the development of mathematical models.	

Expectation A3

1. Determine the equation of the tangent to the curve $f(x) = 4^{5x-3}$ at the point where x = 0. Give the final equation in slope y-intercept form.

2. Determine $\frac{dy}{dx}$. Do NOT simplify.

(a) $y = e^{5x^2-3}$

(b) $y = e^{\sin x}$

(c) $y = 8^{3x^4}$

(d) $y = \sin x \bullet e^{6x-1}$

3. Determine $\frac{dy}{dx}$. Express your answers in fully factored form.

(a) $y = 3x^2 e^{\frac{-1}{2x}}$

(b) $y = \frac{1 + e^x}{x^2}$

Expectation B2

4. At time, t in minutes, the temperature, T, in˚C, of hot chocolate is modeled by the equation **$T = 79(0.95)^t + 19$**. Determine the rate at which the temperature of the hot chocolate is changing when it is 50˚C.

5. Determine the equation for the tangent to the curve y = x - tanx at the point with x-coordinate $\frac{\pi}{3}$. Give the equation in slope y-intercept form.

6. The concentrations of two prescription drugs in the blood stream after a single dose can be modeled by the equations **$m(t) = (5t)e^{-2t}$**, and **$n(t) = 5t^2(e^{-t})$**, where m and n represent the concentrations of the drugs, and t represents the time in hours since the drugs were taken.
Which drug has the larger maximum concentration? Will it always have the larger concentration?